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Michael Huesemann: Why Technology Can't Save Us

IFG Teach-In: Techno-Utopianism & The Fate of the Earth

Great Hall of the Cooper Union, New York City

October 25, 2014

Introduction by Richard Heinberg

This next panel is on the subject of False Solutions. We're constantly told that the problems that we have – whether those problems are climate change or slowing economic growth or what have – will be solved by *some* kind of new technology.

We have two panelists that will dispute that assertion and neither of them will be using slides; apparently we're all in agreement that power corrupts but power point corrupts absolutely.

First up will be Michael Huesemann. He received his Ph.D. in chemical engineering from Rice University and he's conducted experiemntal and theoretical research in environmental biotechnology for more than 25 years. He's published on a wide range of topics in engineering, biotechnology, environmental science, policy analysis, sustainability, and critical science.

He and his wife, Dr. Joyce Huesemann, have published a powerful critique of modern science and technology, the book, [Techno-Fix: Why Technology Won't Save Us or the Environment](#) [New Society Publishers, 2011]. I highly recommend it. It is a trenchant and very well-written analysis of many of the topics that we're discussing this weekend. So please welcome Michael Huesemann.

Thank you Richard for introducing me.

At this teach-in this weekend, I'm one of the few speakers, perhaps the only one, with a long background in engineering research. How is it that an insider of the science and engineering establishment is critical of modern technology?

As a student, when I first decided to become a chemical engineer, I thought that inventing and developing powerful new technologies would be the best way to help people and the

environment. After receiving my doctorate in chemical engineering I began my career in an environmental research department at a large multinational corporation. I was highly motivated to put technology to work to clean up the environmental pollution the company had created.

One day, I gave a presentation to managers and senior researchers about my research plan: how to perform objective and unbiased research to identify the environmental contaminants and find solutions for cleanup.

In my naïvete I had not been aware that the company was not seriously interested in cleaning up the environment but rather only to make the contamination appear harmless to regulators and the public. They indeed – in fact – wanted me to design experiments in a way to get more positive looking results, to make the contamination appear more harmless than it was.

When I continued, in my naïvete, to defend my research plan, one senior manager got increasingly frustrated with my persistence to carry out unbiased objective research. He suddenly stood up, interrupted my presentation in front of all these other people and said, “Michael, you are not here to do science. You can do science on the weekend.”

Right then and there I realized that science, and by implication technology, are not necessarily used for good purposes.

I soon left the company, but still was optimistic that technology was one of the best ways to save the environment and create a sustainable future.

Over the last 20 years, I have worked in three different research areas to develop innovative environmental technologies. In all cases, I’ve found that technology was not able to solve the environmental problems, or only in a very limited way.

So I began to question the entire approach of using technology as a main way to solve humanity’s many problems. This analysis, of the limitations of technology, ultimately led to the publication of a book co-authored with my scientist wife, [*Techno-Fix – Why Technology Won’t Save Us Or The Environment*](#) (as Richard already mentioned).

So then, what are the limitations of technology? Can technology really solve major environmental and social problems?

Let me start by pointing out two very profound and important limitations of *any* technology.

- First, negative consequences are inherently unavoidable.
- Second, these negative consequences are unpredictable.

These two limitations are very important so let me explain further.

Negative environmental consequences of technology are inevitable because several ecological principles are violated when we apply technology. [Barry Commoner](#), an activist biology

professor, paraphrased these laws of ecologies in an entertaining way as follows.

- The first law: *everything is connected to everything else*. So when we apply technology in one area of the environment, or nature, it is very likely that it will have an impact somewhere else in the system because everything is interconnected.
- The second law of ecology: *nature knows best*. Meaning that through millions of years of evolution a sort of natural, optimal balance has formed in nature and when we apply our more or less klunky technology it is very likely that this natural optimized balance is disturbed, leading to negative consequences.
- The third law of ecology: *there is no such thing as a free lunch*. Everything has a cost, sooner or later. For instance we use technology to increase our material standard of living which is perceived to be a benefit. But it comes with a heavy cost, such as environmental pollution and social problems.

The question now is, why are scientists not smart enough to anticipate all these problems of technology? The answer is the scientific method, that we currently have, is not good enough.

The scientific method that has developed through the last so many hundred years is based on mechanistic reductionism which means we are trying to understand the whole by looking at isolated parts; by looking at isolated cost and effect relationships. That's what we do all the time. When we do research in the laboratory we just look at one parameter at a time.

So the scientific method really has both power and weakness at the same time. It has a power to create knowledge about isolated cause and effect relationships that we then can exploit with technologies.

At the same time, it also has a weakness that the scientific method cannot then predict all the unintended consequences of the application of technology. Because we never understand the whole system – all the interrelated relationships remain unknown because we will never have enough research funds to elucidate all of them.

Let me give you a simple example. A hundred years ago, scientists were very good at elucidating the atomic chain reactions – single cause and effect relationships. That knowledge was immediately exploited building nuclear reactors and nuclear weapons. And as soon as we apply those technologies we either have Hiroshima, or we have Fukushima. And in all these cases then, we don't know really what the effect of the radioactive poisoning is. There will never be enough funding to figure it all out.

So now we have created all these problems that you see around us with technology: global warming, pollution, over population, species extinction. All the slides [Doug Tompkins showed](#) were the indirect or direct results of technology and the unrestrained application of technology and megatechnology.

So we create all these problems [with] technology. And what do we *do*? We apply *more*

technologies – techno-fixes – to solve them. What is a techno-fix? A techno-fix is an attempt to solve a problem with technology. A techno-fix addresses only symptoms instead of root causes.

A techno-fix like oil technologies have negative and unpredictable side-effects. It is called a fix because it does not result in a real, long-term, lasting solution. Techno-fixes are often used in an attempt to solve problems caused by previous technologies. We call those techno-fixes counter-technologies because they try to counter or compensate for problems caused by other technologies. Or techno-fixes try to solve social problems because they had a social fix.

Our society favors techno-fixes because it allows us to ignore large, intractable problems. Problems that are too difficult to solve or whose solutions are controversial.

For example, instead of decreasing the use of fossil fuels, to stop global warming, we are offered various geo-engineering techno-fixes whose consequences are unpredictable and could be catastrophic. And you will hear a [talk by Clive Hamilton](#) shortly, about geo-engineering.

We also use technology in an attempt to address controversial, social problems, such as for example, over population – human over population, of course. This is an example of a social fix. Increasing world population has produced an increasing demand for food, fresh water, oil, and all sorts of limited resources which are rapidly approaching depletion as [Richard Heinberg mentioned this morning](#).

We are not seriously addressing over population because it is controversial to segments of society that seek advantage from it, such as business interests and religious groups. Instead, we witness a parade of techno-fixes such as the green revolution, and now genetic engineering. Which have not, and will not solve the problem but only provides temporary fixes while the environmental and social problems caused by human over population grow larger.

Why do we attempt to use technology to solve social problems? Because it seems easier to apply technological solutions than to change people's behavior.

Another common type of techno-fix are efficiency improvements. We hear it all the time, we just have to increase car efficiency, fossil fuel efficiency, etc. Efficiency improvements are used in an attempt to reduce the use of limited resources like car fuel efficiency or to reduce pollution. However, in many cases greater efficiency has reduced cost, made things cheaper, and in turn has increased consumption. If something is cheaper, if you have a more fuel efficient car, you will drive more.

So in many cases, increasing efficiency has the opposite effect than intended. Instead of reducing resource use and pollution, it has increased it by stimulating consumption. And this is called the Jevons Paradox or Rebound Effect.

One belief in our society is that technology will increase happiness. Otherwise we would not buy all these gadgets, technological gadgets – cell phones, computer, fax machines – all the stuff [Jerry Mander mentioned this morning](#). Our economic system for hundreds of years is based on the utilitarian assumptions that economic growth, and material affluence – which is brought about

by technological innovation – will increase happiness.

However, an increase in material affluence of per capita national income, over time appears to do very little to improve happiness, as determined by sociological matters and surveys.

For example, in the United States, per capita income, material affluence, the standard of living, increased 250 percent – 2.5-fold – from 1946 to 1991. However, during this 45 year period, happiness, as measured by surveys, has remained flat, constant. Even more profound, in Japan, from 1958 to 1991, per capita income, material affluence, increased 6-fold and there was no change in happiness.

At the same time, the application of science and technology have destroyed traditional sources of happiness, such as social interaction with friends, family, and community – think TV, or as Jerry mentioned this morning, screen time. If you are in front of a screen you are not socially interacting anymore, in person.

It has also destroyed satisfying and meaningful work – think assembly line. And it has destroyed closeness to nature – think New York City. New York City is probably the opposite of a wilderness experience. (At least, I'm living close to a national park so I know how it feels.)

We can then summarize the major limitation of technology as follows. First, unintended consequences cannot be avoided or predicted. Second, most attempts to solve social problems, or problems caused by technology with more technology, such as techno-fixes, don't work. And third, technology has failed to increase happiness.

Why is it then, that despite all these rather significant failures of technology, we are still fascinated by technology or with technology and accept anything so uncritically? One reason for our extreme technological optimism and belief in progress is historical.

We need to recognize that the concept of progress is a rather recent historical phenomenon. The concept of progress did not exist in hunter gatherer societies or agricultural societies because they had a cyclical concept of time as the seasons repeated themselves in a periodic fashion.

As long as time is seen as cyclical where events repeat themselves periodically, it is difficult to have a concept of linear progress. The Greeks and Romans did not have a concept of progress.

It is only with the rise of historical religions – Judaism, Christianity, and Islam, that depend on a historical narrative – that there was a change from cyclical to linear concept of time. And seeing time as linear allows the idea of progress to develop. This is the idea of positive change through time.

Of course as we all know, the idea of progress really took off with the enlightenment where reason, human reason, was *supposed* to bring about social and moral progress. Unfortunately, social and moral progress proved to be much more difficult than material progress.

And so the whole concept of human progress was quietly redefined and limited to material

progress which was to be brought about through innovative science and technology and which could easily be measured as economic growth.

Why is it that belief in progress and technological optimism is so strong today – particularly in the United States? By the way the United States is the most techno-optimistic nation on earth so it's very fitting that we have [this] teach-in in the United States and in the biggest city in the United States, New York City.

Why is it that techno-optimism is so strong? There are several reasons. Technology, of course, has delivered the goods in the short term. However we all know the long term negative consequences *will* arrive, sooner or later. And as long as the chickens have not come home to roost we will be very impressed by technology and we will be very optimistic.

And of course, as Jerry mentioned this morning, the media bombard us constantly with 30,000 messages per year – and [a] two hundred billion dollar budget – with messages that technology will make us happy despite evidence to the contrary. There is massive and sustained advertising for new technologies to increase sales and profits. So there is [a] very strong vested interest to keep techno-optimism alive.

In our research for [*Techno-Fix*](#) we found out that ignorance is most likely the basis for most technological optimism. We actually coined, The Law of Techno-Optimism. Techno-Optimism is inversely proportional to knowledge. Meaning that, of course, the less you know about a technology, the more optimistic you are.

And why is the United States the most techno-optimistic nation on earth? Possibly, because scientific illiteracy in the United States is enormous. According – I can back that up – according to a survey by the National Science Foundation a few years ago, 80% of Americans do not meet minimal standards for scientific literacy, 50% of Americans do not believe in biological evolution, 28% of Americans believe in astrology, 25% in witches (I was quite surprised), and 33% in extra-terrestrial visitors.

If scientific illiteracy is extreme, techno-optimism is extreme. Why is excessive and unrealistic techno-optimism dangerous? Because it is preventing us from thinking about low-tech, real solutions to our problem.

Let me conclude with three key points.

- First, be critical of any technology.
- Second, recognize that every technology has serious limitations and that the application *always* has unintended consequences that are unpredictable by the scientific method.
- Third, advanced technologies will not save us and some may well destroy us.